CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.07/KRIDL/CEMENT/2014-15

Date: 28.06.2014

TEST REPORT

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West)**, KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
REFERENCE	:	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
SAMPLE ID	:	Cement
SAMPLES SUPPLIED BY	:	AGENCY

The results of the tests conducted on the cement sample are as follows:

Sl.No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-1989
1	a) Initial Setting Time	IS-4031 (Part -5)	165 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5)	480 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part 3) by the Le-Chatelier method	1 mm	Not more than 10 mm
3	Standard Consistency	IS-4031 (Part -4)	26.00 %	-

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SAND/2014-15 : 28.06.2014

TEST REPORT ON FINE AGGREGATES (SAND)
IS 383-1970 (RA- 2002)

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 28.06.2014

Material : Sand Total Wt. of Aggregates in gms **2000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits For Zone-II
10	0	0	0	100	100
4.75	102	5.10	5.10	94.9	90-100
2.36	224	11.20	16.30	83.7	75-100
1.18	498	24.90	41.20	58.8	55-90
600 Micron	416	20.80	62.00	38.0	35-59
300 Micron	493	24.65	86.65	13.4	8-30
150 Micron	215	10.75	97.40	2.6	0-10

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Job No.: CTCE/BBMP/W.No.07/KRIDL/AGG/2014-15 : 28.06.2014

TEST REPORT ON COARSE AGGREGATES
IS 383-1970 (RA- 2002)

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 28.06.2014

Material : 40mm Aggregates

Total Wt. of Aggregates in gms **26000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits
80	0	0	0	100	100
40	1015	3.90	3.90	96.10	95-100
20	15680	60.31	64.21	35.79	30-70
10	6275	24.13	88.35	11.65	10-35
4.75	2560	9.85	98.19	1.81	0-5

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Job No.: CTCE/BBMP/W.No.07/KRIDL/STEEL/2014-15 28.06.2014

TEST REPORT ON REINFORCEMENT STEEL

Client	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West)**, KRIDL, Bangalore.
Name of the work	:	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	:	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Date of Test	:	28.06.2014
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm²	Tensile strength (Ultimate stress) N/mm²	Elongation percent gauge length		
1	10	0.62	513	552	13.25	O.K	O.K

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Job No.: CTCE/BBMP/W.No.07/KRIDL/STEEL/2014-15 28.06.2014

TEST REPORT ON REINFORCEMENT STEEL

Client	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West)**, KRIDL, Bangalore.
Name of the work	:	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	:	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Date of Test	:	28.06.2014
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm²	Tensile strength (Ultimate stress) N/mm²	Elongation percent gauge length		
1	12	0.89	515	556	13.50	O.K	O.K

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TEST REPORT ON REINFORCEMENT STEEL

Client	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	:	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	:	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Date of Test	:	28.06.2014
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	16	1.59	519	563	13.65	O.K	O.K

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.07/KRIDL/CUBE/2014-15 24.07.2014

TEST REPORT ON CONCRETE CUBES

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of the work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Sample ID : Cement Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{15}

Compressive Strength as on : 28^{th} day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	26.06.2014	24.07.2014	8.123	362.4	16.11
2	26.06.2014	24.07.2014	8.215	378.5	16.82
3	26.06.2014	24.07.2014	8.316	386.9	17.20

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Job No.: CTCE/BBMP/W.No.07/KRIDL/CUBE/2014-15 28.07.2014

TEST REPORT ON CONCRETE CUBES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of the work	: Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	: AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Sample ID	: Cement Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
Grade of Concrete	: M_{20}
Compressive Strength as on	: 28^{th} day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	30.06.2014	28.07.2014	8.234	502.4	22.33
2	30.06.2014	28.07.2014	8.175	488.7	21.72
3	30.06.2014	28.07.2014	8.369	517.8	23.01

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/Gradation/2014-15

08.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25500**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	955	955	3.7	96.3	95-100
22.4	6130	7085	27.8	72.2	60-80
11.2	5590	12675	49.7	50.3	40-60
4.75	4150	16825	66.0	34.0	25-40
2.36	3760	20585	80.7	19.3	15-30
0.600	2245	22830	89.5	10.5	8-22
0.075	2385	25215	98.9	1.1	0-8

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GRADATION FOR WMM
MORTH TABLE-400-11

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Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): 26445

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	726	726	2.7	97.3	95-100
22.4	8204	8930	33.8	66.2	60-80
11.2	4940	13870	52.4	47.6	40-60
4.75	3980	17850	67.5	32.5	25-40
2.36	3208	21058	79.6	20.4	15-30
0.600	2939	23997	90.7	9.3	8-22
0.075	1868	25865	97.8	2.2	0-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/Gradation/2014-15 08.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **27670**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	812	812	2.9	97.1	95-100
22.4	8659	9471	34.2	65.8	60-80
11.2	5024	14495	52.4	47.6	40-60
4.75	4316	18811	68.0	32.0	25-40
2.36	3158	21969	79.4	20.6	15-30
0.600	2475	24444	88.3	11.7	8-22
0.075	2356	26800	96.9	3.1	0-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/Gradation/2014-15 08.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): 25875

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	825	825	3.2	96.8	95-100
22.4	6435	7260	28.1	71.9	60-80
11.2	4879	12139	46.9	53.1	40-60
4.75	3526	15665	60.5	39.5	25-40
2.36	3421	19086	73.8	26.2	15-30
0.600	4125	23211	89.7	10.3	8-22
0.075	1974	25185	97.3	2.7	0-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/Gradation/2014-15 08.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **25695**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	867	867	3.4	96.6	95-100
22.4	6285	7152	27.8	72.2	60-80
11.2	5489	12641	49.2	50.8	40-60
4.75	4319	16960	66.0	34.0	25-40
2.36	3787	20747	80.7	19.3	15-30
0.600	2314	23061	89.7	10.3	8-22
0.075	1854	24915	97.0	3.0	0-8

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GRADATION FOR WMM
MORTH TABLE-400-11

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Agency : **Technical Manager (West),** KRIDL, Bangalore.

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Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **26750**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	997	997	3.7	96.3	95-100
22.4	7835	8832	33.0	67.0	60-80
11.2	5172	14004	52.4	47.6	40-60
4.75	5185	19189	71.7	28.3	25-40
2.36	2592	21781	81.4	18.6	15-30
0.600	2247	24028	89.8	10.2	8-22
0.075	2052	26080	97.5	2.5	0-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/Gradation/2014-15 08.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **26145**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	845	845	3.2	96.8	95-100
22.4	6470	7315	28.0	72.0	60-80
11.2	4876	12191	46.6	53.4	40-60
4.75	3792	15983	61.1	38.9	25-40
2.36	3335	19318	73.9	26.1	15-30
0.600	4221	23539	90.0	10.0	8-22
0.075	2016	25555	97.7	2.3	0-8

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GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

Reference : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **26800**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	838	838	3.1	96.9	95-100
22.4	6679	7517	28.0	72.0	60-80
11.2	4893	12410	46.3	53.7	40-60
4.75	3675	16085	60.0	40.0	25-40
2.36	3526	19611	73.2	26.8	15-30
0.600	4171	23782	88.7	11.3	8-22
0.075	2028	25810	96.3	3.7	0-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/AIV/2014-15 08.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.07.2014

Sl No.	Details	Trial No.			Average
		1	2	3	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	383	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	80	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	303	299	
4	Aggregate Impact value = percent fines	21.30	20.89	22.34	
	100* (W_2/W_1)%				21.51

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Sample ID	WMM Layer
Type of Mix	Wet Mix macadam
Date of Testing	08.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	386	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	300	300	
4	Aggregate Impact value = percent fines	21.96	22.28	21.67	
	$100^* (W_2/W_1)\%$				21.97

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Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Sample ID	WMM Layer
Type of Mix	Wet Mix macadam
Date of Testing	08.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	388	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	300	
4	Aggregate Impact value = percent fines	21.96	22.16	21.67	
	$100^* (W_2/W_1)\%$				21.93

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Sample ID	WMM Layer
Type of Mix	Wet Mix macadam
Date of Testing	08.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	387	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	301	
4	Aggregate Impact value = percent fines	21.82	22.22	22.62	
	$100^* (W_2/W_1)\%$				22.22

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/S-T/2014-15 08.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	08.07.2014

Result : Flakiness Index = **11.56%**

Elongation Index = **13.87%**

Result : Combined Flakiness & Elongation index 25.43%

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